



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/811,300

03/26/2004

Alessandro Pizzochero

3525.1003-002

8258

21005

7590

06/19/2006

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.  
530 VIRGINIA ROAD  
P.O. BOX 9133  
CONCORD, MA 01742-9133

EXAMINER

CUEVAS, PEDRO J

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 06/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/811,300

Applicant(s)

PIZZOCHERO ET AL.

Examiner

Pedro J. Cuevas

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Response to Arguments***

1. Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-10 and 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,882 A to Lazarus et al. (prior art document submitted by applicant) in view of U.S. Patent No. 5,305,507 A to Dvorsky et al. (prior art document submitted by applicant).

Lazarus et al. clearly teaches the construction of a packaged strain actuator, comprising:

a transducer (12) including electro-active material (71, 73) that generates electrical energy under dynamic mechanical loading and non-electro-active material (72) coupled to the electro-active material, including stress, and is manufactured through a lamination process;

a laminar buffer (110 - bottom), which can be more (column 5, lines 48-58) or less (column 5, lines 59-65) stiffer than a local stiffness of a structure (20), mechanically coupled by surface bonding (column 4, lines 44-48) to the transducer, the buffer facilitating the transducer to operate within a predetermined mechanical loading range to

allow the electrical power generation system to generate the electrical energy and defining two ends, at least one of the ends (bottom) attached to the structure; and a second laminar metal buffer (110 - top) coupled to the transducer separate from the other buffer, and forming a seal (elements 110 + 120) around the transducer.

However, it fails to disclose:

an electrically conductive pattern electrically coupled to the transducer and disposed on a film in different layers in a layered relationship with the transducer, the electrically conductive pattern collecting electrical energy generated by the transducer;

a second buffer external from and mechanically encapsulating the transducer with the other buffer, the electrically conductive pattern including contacts exposed external from buffers; and

an energy harvesting circuit electrically coupled to the electrically conductive pattern and disposed in different layers of a layered relationship with the transducer.

Dvorsky et al. teach the construction of a method for encapsulating a ceramic device, comprising:

an electrically conductive pattern (12, 14) electrically coupled to the transducer and disposed on a film in different layers in a layered relationship with the transducer (Figure 1), the electrically conductive pattern collecting electrical energy generated by the transducer; and

a second buffer (20) external from and mechanically encapsulating (surrounding) transducer(s) (10) having electrically conductive pattern contacts (16, 18) exposed external from buffer (Figure 2);

Art Unit: 2834

for the purpose of converting energy in a predetermined frequency range to electric energy;  
for the purpose of embedding the device in composite structures.

It would have been obvious to one skilled in the art at the time the invention was made to use the electrically conductive pattern and buffer arrangement disclosed by Dvorsky et al. on the packaged strain actuator disclosed by Lazarus et al. for the purpose of embedding the device in composite structures.

4. With regards to claims 3 and 5, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use:

a composite, metal, fiber, or polymer to make a stiffer buffer; or

a rubber, foam, plastic, or composite to make a less stiff buffer;

since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

*In re Leshin*, 125 USPQ 416.

5. Claims 11-13, and 21-29 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,882 A to Lazarus et al. (prior art document submitted by applicant) in view of U.S. Patent No. 5,305,507 A to Dvorsky et al. (prior art document submitted by applicant) as applied to claims 3, 5, 8-10, 14, and 18 above, and further in view of U.S. Patent No. 4,467,236 to Kolm et al.

Lazarus et al. in view of Dvorsky et al. disclose the construction of a packaged strain actuator as disclosed above, and having circuits and transducers on the same layer (column 3, line 52 to column 4, line 9).

However, it fails to disclose:

an energy harvesting circuit electrically coupled to the electrically conductive pattern and disposed in different layers of a layered relationship with the transducer;

a planar housing enclosing the transducer and circuit, the housing:

allowing the transducer to be exposed to the dynamic motion conditions,

mechanically coupled to the transducer and adapted to be mechanically coupled to a structure, at least a portion of the housing facilitating the transducer to operate within a predetermined mechanical loading range to allow the transducer to generate electricity, and

providing electrical contacts coupled to the circuit output to facilitate delivery of the usable electricity for external circuitry.

Kolm et al. teach the construction of a piezoelectric acousto-electric generator comprising:

an energy harvesting circuit (Figure 2) electrically coupled to the electrically conductive pattern and disposed in different layers of a layered relationship with the transducer; and

a planar (Figure 4) housing (12) enclosing the transducer and circuit, the housing allowing the transducer to be exposed to the dynamic motion conditions and providing electrical contacts coupled to the circuit output to facilitate delivery of the usable electricity for external circuitry;

for the purpose of converting energy in a predetermined frequency range to electric energy.

It would have been obvious to one skilled in the art at the time the invention was made to use the energy harvesting circuit and housing disclosed by Kolm et al. on the a packaged strain

Art Unit: 2834

actuator disclosed by Lazarus et al. in view of Dvorsky et al. for the purpose of converting energy in a predetermined frequency range to electric energy.


*Conclusion*

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pedro J. Cuevas whose telephone number is (571) 272-2021. The examiner can normally be reached on M-F from 8:30 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on (571) 272-2044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Pedro J. Cuevas  
June 8, 2006

  
DARREN SCHUBERG  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800